Curriculum Vitae

Name: **Claudia M. Palena, Ph.D.**

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Education:

1995	M.S. (Biochemistry), National University of Rosario, Rosario, Argentina
2000	Ph.D. (Biochemistry), National University of Rosario, Rosario, Argentina

Brief Chronology of Employment

1996 – 2000	Ph.D. Research Fellow, School of Biochemistry and Pharmaceutical Sciences, National University of Rosario, Argentina
2000 – 2005	Postdoctoral Fellow, Laboratory of Tumor Immunology and Biology, National Cancer Institute, NIH, Bethesda, MD
2005 – 2008	Research Fellow, Laboratory of Tumor Immunology and Biology, National Cancer Institute, NIH, Bethesda, MD
2008 – present	Staff Scientist, Head Immunoregulation Group, Laboratory of Tumor Immunology and Biology, National Cancer Institute, NIH, Bethesda, MD

Fellowships and Scholarships

1993 –1995	Scholarship for Training in Scientific Research, Helios Foundation, Argentina. Mentor: Dr. Ruben Vallejos, CEFOBI, Argentine Research Council, National University of Rosario, Argentina
1995 – 1996	Scholarship for University Students Excelling in Scientific and Humanistic Disciplines, Antorchas Foundation, Argentina
1996 – 2000	Ph.D. Research Fellowship, Argentine Research Council, National University of Rosario, Argentina.

Honors and Other Scientific Recognitions

- Academic Merit Award, National University of Rosario, Argentina, 1996
- Exceptional Performance Award, CCR, NCI, NIH 2003, 2007, 2008, 2009, 2010, 2011
- Federal Technology Transfer Award, CCR, NCI, NIH 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010
- NIH Group Merit Award, "For achievements in the field of therapeutic cancer vaccines, from vaccine design to science-driven clinical studies, as an outstanding translational program." 2009

Membership/Societies

- Active Member, American Association for Cancer Research
- Full Member, Metastasis Research Society
- Member, Cancer Immunology Working Group, American Association for Cancer Research
- Member, Tumor Microenvironment (TME) Working Group Member, American Association for Cancer Research
- Member, Vaccine working group, NCI, NIH

Editorial Board Member

- ISRN Immunology

Technology Transfer

1. U.S. Application No. 12/528,796. European Application No. 08743578.0. Australian Application No. 2008221383. Canadian Application No. 2,678,404. Japanese Application No. 2009-551830. (E-074-2007) Inventors: Palena, Schlom, Kozlov
   Title: "Brachyury polypeptides and methods for their use."
   In national stage in U.S. Canada, Europe and Japan.

2. New U.S. Provisional Application. Filed on 3/17/11 by Globeimmune, Inc.
   Title: "The development and use of a recombinant Brachyury Saccharomyces cerevisiae (yeast) vaccine for the prevention and/or therapy of human cancer."
   Inventors: Schlom, Palena, Guo, Apelian

Academic Appointments/Teaching

1990 – 1992	Undergraduate Teaching Assistant, Department of Biology, National University of Rosario, Argentina
1993 – 1994	Undergraduate Teaching Assistant, Department of Microbiology, National University of Rosario, Argentina
1995 – 1999	Graduate Student Instructor, Department of Biological Chemistry, National University of Rosario, Argentina
1999 – 2000	Graduate Student Instructor, Department of Molecular Biology, National University of Litoral, Argentina

Mentoring

Current Postdoctoral Fellows

2006-present	Dr. Romaine I. Fernando
2008-present	Dr. Duane Hamilton
2008-present	Dr. Bruce Huang
2011-present	Dr. Alessandra Jales

Previous Postdoctoral Fellows

2007-2008	Dr. Paola Trono Currently: Postdoctoral Fellow, Laboratory of Immunology, Regina Elena Cancer Institute, Rome, Italy
2006-2011	Dr. Mary Litzinger Currently: Manager of Educational and Career Development Program, American Association of Immunologists, AAI, Bethesda, MD

Howard Hughes Medical Institute-NCI Research Scholars

2008-2009	Marianne Castillo, MS, MD. Currently: Completed her MD at University of Medicine and Dentistry of New Jersey (UMDNJ), New Jersey Medical School, New Jersey
2010-present	Cecilia Larocca, 3rd year Medical School- John Hopkins University School of Medicine

Invited Presentations

International

1. "Serum Proteomics Patterns for Cancer Diagnostics", Istituto Regina Elena, Rome, Italy, 2002

2. "Novel Strategies for the Immunotherapy of Chronic Lymphocytic Leukemia", The Second International Cancer Vaccine Meeting, Siena, Italy, 2006

National

1. "Brachyury-targeted T-cell immunotherapy for chordoma", Second International Chordoma Research Workshop, Bethesda, MD, 2008

2. "Vaccine-strategies aimed at blocking metastasis by targeting of molecules that control the epithelial-to-mesenchymal transition", 2nd Annual Cancer Targets and Therapeutics Conference, San Francisco, CA, October 2010

3. "Brachyury as a target for T-cell immunotherapy", Third International Chordoma Research Workshop, Bethesda, MD, March 2011

4. "Targeting Cancer Stem Cells and the Epithelial-to-Mesenchymal Transition" 2nd World Cancer Vaccine Summit, Boston, MA, Scheduled for June 22-23 2011

5. "Immunology of Cancer Stem Cells & EMT." 26th Annual Meeting of the Society for Immunotherapy of Cancer (SITC), formerly the International Society for Biological Therapy of Cancer (iSBTc), Bethesda, MD, Scheduled for November 4-6, 2011

6. "Brachyury as a vaccine target for the control of the epithelial-to-mesenchymal transition of carcinoma cells", International Conference and Exhibition on Cell Science & Stem Cell Research, Philadelphia, Scheduled for Nov 29-Dec 1 2011

Bibliography

Published

1. **Palena C**, Fernando RI, Litzinger, MT, Hamilton, DH, Huang B, and Schlom J. Strategies to target molecules that control the acquisition of a mesenchymal-like phenotype by carcinoma cells. **Exp Biol Med 236(5): 537-45, 2011.**

2. **Palena C** and Schlom J. Vaccines against human carcinomas: strategies to improve anti-tumor immune responses. **J Biomed Biotechnol, Mar 16.** [**Epub ahead of print], 2010**.

3. Litzinger MT, Foon KA, Tsang KY, Schlom J, and **Palena C**. Comparative analysis of MVA-CD40L and MVA-TRICOM vectors for enhancing the immunogenicity of CLL cells. **Leuk Res 34(10):1351-7, 2010**

4. Fernando RI, Litzinger MT, Trono P, Hamilton D, Schlom J, and **Palena C**. The T-box transcription factor Brachyury promotes epithelial-to-mesenchymal transition in human tumor cells**. J Clin Invest 120(2):533-44, 2010.**

5. Cereda V, Poole DJ, **Palena C**, Das S, Bera TK, Remondo C, Gulley JL, Arlen PM, Yokokawa J, Pastan I, Schlom J, and Tsang KY. New Gene expressed in prostate: a potential target for T cell-mediated prostate cancer immunotherapy. **Cancer Immunol Immunother 59:63-71, 2010.**

6. Litzinger MT, Foon KA, Sabzevari H, Tsang KY, Schlom J, and **Palena C**. Chronic lymphocytic leukemia (CLL) cells genetically modified to express high B7-1, ICAM-1, and LFA-3 confer APC capacity to T cells from CLL patients. **Cancer Immunol Immunother 58: 955-965, 2009.**

7. Gulley JL, Arlen PM, Tsang KY, Yokokawa J, **Palena C**, Poole DJ, Remondo C, Cereda V, Jones JL, Pazdur MP, Higgins JP, Hodge JW, Steinberg SM, Kotz H, Dahut WL, and Schlom J. Pilot study of vaccination with recombinant CEA-MUC-1-TRICOM poxviral-based vaccines in patients with metastatic carcinoma. **Clin. Cancer Res 14: 3060-3069, 2008.**

8. Litzinger MT, Fernando R, Curiel T, Grosenbach D, Schlom J, and **Palena C**. The IL-2 immunotoxin denileukin diftitox partially depletes regulatory T cells and enhances T-cell immunity to recombinant poxvirus vaccines. **Blood 110:3192-201, 2007.**

9. **Palena C**, Polev DE, Tsang KY, Fernando RI, Litzinger M, Krukovskaya LL, Baranova AV, Kozlov AP, and Schlom J. The human T-box mesodermal transcription factor Brachyury is a candidate target for T-cell mediated cancer immunotherapy. **Clin Cancer Res 13: 2471-2478, 2007.**

10. Yokokawa J, Bera, TK, **Palena C**, Cereda V, Remondo, C, Gulley, JL, Arlen P, Pastan I, Schlom J, and Tsang KY. Identification of cytotoxic T-lymphoctyte epitope(s) and its agonist epitope(s) of a novel target for vaccine therapy (PAGE4). **Int J Cancer 121:595-605, 2007.**

11. **Palena C**, Abrams SI, Schlom J, and Hodge JW. Cancer Vaccines: Preclinical Studies and Novel Strategies. **Adv Cancer Res 95:115-45, 2006**.

12. Gelbard A, Garnett CT, Abrams SI, Patel V, Gutkind SJ, **Palena C**, Tsang KY, Schlom J, and Hodge JW. Combination Chemotherapy and Radiation of Human Squamous Cell Carcinoma of the Head and Neck Augments CTL-Mediated Lysis. **Clin Cancer Res 12: 1897- 1905, 2006.**

13. **Palena C**, Foon KA, Panicali, D, Gomez Yafal A, Chinsangaram, J, Hodge, JW, Schlom J, and Tsang KY. A Potential approach to immunotherapy of chronic lymphocytic leukemia (CLL): enhanced immunogenicity of CLL cells via infection with vectors encoding for multiple costimulatory molecules. **Blood 106: 3515-3523, 2005.**

a. EDITORIAL COMMENT: MVA-TRICOM vaccine strategy makes CLL cells an attractive T-cell target. John C. Byrd. Blood 106: 3334-3335, 2005

14. Yokokawa J, **Palena C**, Arlen P, Hassan R, Ho M, Pastan I, Schlom J, and Tsang KY. Identification of novel human CTL epitopes and their agonist epitopes of mesothelin. **Clin Cancer Res 11:6342-6351, 2005.**

15. Tsang KY, **Palena C**, Yokokawa J, Arlen PM, Gulley JL, Mazzara GP, Gritz, L, Gomez Yafal A, Ogueta, S, Greenhalgh , P, Manson K, , Panicalli D, and Schlom J. (2005). Analysis of recombinant vaccinia and fowlpox vaccine vectors expressing transgenes for two human tumor antigens and three human costimulatory molecules. **Clin Cancer Res 11: 1597-1607, 2005.**

16. **Palena C**, Zhu MZ, Schlom J, and Tsang KY. Human B cells that hyperexpress a triad of costimulatory molecules via avipox-vector infection: an alternative source of efficient antigen-presenting cells. **Blood 104:192-199, 2004.**

17. Garnett CT, **Palena C**, Chakarborty M, Tsang KY, Schlom J, and Hodge JW. Low dose irradiation of human tumor cells modulates phenotype resulting in enhanced killing by CTL. **Cancer Res 64:7985-7994, 2004.**

18. Schlom J, **Palena C**, Greiner JW, Tsang KY, Grosenbach DW, Sabzevari H, Gulley J, Arlen P, Kass E, and Hodge JW. Combinatorial vaccine strategies and the use of molecular arrays to characterize T-cell activation. Brown F, Petricciani J (eds): Development of Therapeutic Cancer Vaccines. **Dev Biol Basel, Karger, 116:27-4, 2004.**

19. Tsang KY, **Palena C**, Gulley J, Arlen P, and Schlom J. A human cytotoxic T-lymphocyte epitope and its agonist epitope from the non-variable number of tandem repeat sequence of MUC-1. **Clin Cancer Res 10:2139-2149, 2004.**

20. **Palena C**, Schlom J, and Tsang KY. Differential Gene Expression Profiles in a Human T-Cell Line Stimulated with a Tumor-Associated "Self" Peptide vs. an Enhancer Agonist Peptide. **Clin Cancer Res 9 (5):1616-1627, 2003.**

21. Arlen PM, Gulley J, **Palena C**, Marshall J, Schlom J, and Tsang KY. A novel ELISPOT assay to enhance detection of antigen-specific T cells employing antigen-presenting cells expressing vector-driven human B7-1. **J Immunol Methods 279:183-192, 2003.**

22. **Palena C**, Arlen P, Zeytin H, Greiner J, Schlom J, and Tsang KY. Enhanced Expression of Lymphotactin by CD8+ T cells is Selectively Induced by Enhancer Agonist Peptides of Tumor-Associated Antigens. **Cytokine 24:128-142., 2003**.

23. **Palena CM**, Tron AE, Bertoncini CW, Gonzalez DH, and Chan RL. Positively charged residues at the N-terminal arm of the homeodomain are required for efficient DNA binding by homeodomain-leucine zipper proteins. **J Mol Biol 308 (1): 39-47, 2001.**

24. Tron AE, Bertoncini CW, Palena CM, Chan RL, and Gonzalez DH. Combinatorial Interactions of Two Amino Acids with a Single Base Pair Define Target Site Specificity in Plant Dimeric Homeodomain Proteins. **Nucleic Acids Res 29 (23): 4866-4872, 2001.**

25. **Palena CM**, Gonzalez DH, Chan RL. A monomer-dimer equilibrium modulates the interaction of the sunflower homeodomain-leucine zipper protein Hahb-4 with DNA. **Biochem Journal 341 (1): 81-87, 1999.**

26. Chan RL, Gago GM, **Palena CM**, Gonzalez DH. Homeoboxes in plant development. **Biochim Biophys Acta 1442 (1): 1-19, 1998.**

27. **Palena CM**, Gonzalez DH, Guelman SA, Chan RL. Expression of sunflower homeodomain containing proteins in Escherichia coli. Purification and functional studies. **Prot Exp Purif 13 (1): 97-103, 1998.**

28. **Palena CM**, Chan RL, Gonzalez DH. A novel type of dimerization motif, related to leucine zippers, is present in plant homeodomain proteins. **Biochim Biophys Acta 135: 203-212, 1997.**

29. Vallejos, RH, Alvarez, ML, Cervigni, GD, Heisterborg, CM, Morata, MM, Ortiz, JP, **Palena, CM**, Permingeat, HR, Ravizzini, RA, Rossi, GL, Spiteler, MA. Genetic engineering of cereals: transgene expression in maize and wheat. **Biotecnología Aplicada 13, 288., 1996.**

Selected Abstracts

1. Fernando RI, Litzinger M, Hamilton D, Huang B, Schlom J, and **Palena C**. The T-box transcription factor Brachyury induces epithelial-to-mesenchymal transition in human epithelial tumor cells. "EMT and Cancer Progression and Treatment". Arlington, VA, 2010.
   Abstract selected for Oral presentation

2. Hamilton D, Fernando RI, Litzinger M, , Huang B, Tsang, KY, Schlom J, and **Palena C**. Brachyury is a potential target for immunotherapeutic interventions aimed at eliminating invasive human tumor cells. "EMT and Cancer Progression and Treatment". Arlington, VA, 2010.

3. Huang B, Litzinger M, Hamilton D, Fernando RI, Schlom J, and **Palena C**. Analysis of expression of transcriptional regulators of epithelial-to-mesenchymal transition in lung tumor tissues of various stages. "EMT and Cancer Progression and Treatment". Arlington, VA, 2010.

4. Litzinger M, Fernando RI, Schlom J, and **Palena C**. The T-box transcription factor Brachyury promotes epithelial-to-mesenchymal transition (EMT) in human tumor cells. Keystone symposium: "Extrinsic Control of Tumor Genesis and Progression," Vancouver, 2009.

5. Castillo MD, Hamilton D, Fernando RI, Litzinger M, Schlom J, and P**alena C**. Induction of a mesenchymal phenotype in tumor cells and a cytokine signature associated with tumor

progression. Keystone symposium: "Extrinsic Control of Tumor Genesis and Progression," Vancouver, 2009.

6. **Palena C**, Fernando RI, Litzinger M, and Schlom J. A molecule that controls the epithelial-to-mesenchymal transition (EMT) in tumor cells is a candidate target for T-cell mediated cancer immunotherapy. 2009 NCI Intramural Scientific Investigators Retreat, Bethesda, MD, 2009.

7. Fernando RI, Trono P, Litzinger M, Schlom J, and **Palena C**. The T-box transcription factor Brachyury controls tumor cell migration and invasion. American Association for Cancer Research, San Diego, CA, 2008.

8. Trono P, Fernando RI, Foon KA, Polev D, Kozlov AP, Schlom J, and **Palena C**. The T-box transcription factor Brachyury is expressed in tumors of B-cell origin. American Association for Cancer Research, San Diego, CA, 2008.

9. Litzinger M, Fernando R, Curiel TJ, Schlom J, and **Palena C**. Importance of dose scheduling of denileukin diftitox/vaccine combination therapy to reduce Tregs and to enhance immune responses. American Association for Cancer Research, 2007.

10. Schlom J, Hodge J, Greiner J, Tsang KY, **Palena C**, Abrams J, Gulley J, Madan R, and Arlen P. Combining Cancer Vaccines with Other Agents: Preclinical Models. FDA-NCI Sponsored Meeting on Cancer Vaccines, Bethesda, 2007.

11. Yokokawa J, Bera, TK, **Palena C**, Poole, D, Arlen P, Gulley, JL, Pastan I, Schlom J, and Tsang KY. Identification of cytotoxic T-lymphoctyte epitope(s) and its agonist epitope(s) of a novel target for vaccine therapy. American Association for Cancer Research, 2006.

12. Yokokawa J, **Palena C**, Arlen P, Gulley, J, Beetham, P, Hassan R, Pastan I, Schlom J, and Tsang KY. Identification of novel human cytotoxic T-lymphocyte epitope(s) and its agonist epitope(s) of mesothelin. American Association for Cancer Research, 2005.

13. **Palena, C**, McIntosh, L, Schlom, J, Foon, K, Panicali, D, and Tsang, KY. Modification of B-CLL Cells *Via* Infection with a Replication-Defective MVA Virus Encoding Three Costimulatory Molecules: A Potential Approach to Tumor Cell Immunotherapy of B-CLL. American Society of Hematology, Blood, 104: 2516, 2004.

14. Tsang, KY, **Palena, C**, Arlen, P, Gulley, J, and Schlom, J. Activation of human T-cells specific to CEA and MUC-1 via PANVAC vectors. International Meeting on Cancer Vaccines, Siena, Italy, 2004.

15. Gulley, J., Dahut, W., Arlen, P., Bastian, A., Rucker, S., Marte, J., Beetham, P., **Palena, C**., Seetharam, M., Tsang, K., Coleman, N, Panicalli, D, and Schlom, J. A PSA-based vaccine in a randomized phase II study of patients with localized prostate cnacer receiving standard radiotherapy. American Association for Cancer Research, 2003.

16. **Palena, C**., Zhu, M.Z., Arlen, P., Gulley, J., Schlom, J. and Tsang, KY. Enhanced activation of antigen-specific T cells via recombinant avipox vector mediated expression of three costimulatory molecules (B7-1, ICAM-1 and LFA-3) in human B cells. American Association for Cancer Research, 2003.

17. Arlen, P., Gulley, J., Parker, C., Skarupa, L., Pazdur, M., Panicali, D., Beetham, P., **Palena, C**., Tsang, K.Y., Schlom, J., Dahut, W. A Randomized Pilot Study of Concurrent Docetaxel Plus PSA Pox-Vaccine Versus Vaccine Alone in Metastatic Androgen Independent Prostate Cancer. American Society of Clinical Oncology, 2003.

18. Gulley, J., Dahut, W., Arlen, P., Bastian, A., Rucker, S., Novik, L., Marte, J., Douglas, R., Harris, R., Panicali, D., **Palena, C.,** Tsang, K.Y., Coleman, N., Schlom, J. A PSA- based vaccine in a randomized phase II study of patients with localized prostate cancer reciveing standard radioteraphy. American Urological Association, 2003.